

**EFFICACY REVIEW**  
by Mark Suarez, Entomologist - IB

*Mark F. S.*  
**APRIL 2005**

**DATE:** 5 April 2005

**EPA REG. NUMBER:** 279-3206

**PRODUCT NAME:** Talstar TC Flowable Termiticide/Insecticide

**REGISTRANT:** 279; FMC Corp., Agricultural Products Group

**RM:** George LaRocca, PM13  
**REVIEWER:** BeWanda Alexander

**DECISION #.:** 339770  
**DP BARCODE:** 299257

**ACTION:** R34

**ACTIVE INGREDIENT(S):** 128825, Bifenthrin.....7.9%

**TYPE:**

**OPPTS GUIDELINE(S):** 810.1000  
810.3000  
810.3300  
810.3500

**MRID:** 46371601  
46393501

**GLP ?:** No.

**SITES:** Ubiquitous

**PESTS:** Mosquitoes, Cockroaches, Ticks, Spiders, House  
flies, Fleas.

**APPLICATION RATE:** Variable, see below.

**LABEL RATE:** 0.02 – 0.06% applied as a liquid



## STUDY SUMMARIES:

The registrant has submitted the data in support of the following claims:

1. Mosquitoes, up to 4 weeks residual control;
2. Cockroaches, up to 7 months residual control;
3. Ticks, up to 4 weeks residual control;
4. Spiders, up to 4 months residual control;
5. House flies, up to 3 months residual control;
6. Fleas, up to 3 months residual control.

### Mosquitoes [46393501]

The registrant tested Talstar 10 PH, see MRID 46101401, at a rate of 0.06% @ 1 gal/ 1000 sq ft (equivalent to 1fl oz/ 1000 sq ft TalstarOne Multi-insecticide) against *Aedes aegypti* and *Anopheles quadramaculatus*. The efficacy of the product when applied as a 0.03% and 0.06% solution to surfaces (unpainted wood, painted wood, water repellent-treated wood, cement, and vinyl) and foliage (*Schefflera* sp.) was tested in a laboratory assay against *Aedes aegypti*. Mortality of mosquitoes was assessed after a 24 hour exposure period at 1 day, 2, 6, 8, and up to 10 weeks (see Table 1). Treated samples were stored in a green house between trials.

Surface	Time	% Mortality		
		Untreated	0.03%	0.06%
Schefflera	1 Day	20	95	100
	2 Weeks	23	100	100
Cement	2 Weeks	15	90	100
	6 Weeks	3	69	93
	8 Weeks	0	51	87
Vinyl	2 Weeks	15	90	100
	6 Weeks	0	90	97
	8 Weeks	0	83	98
Unpainted Wood	1 Day	24	100	100
	2 Weeks	3	70	92
	6 Weeks	2	74	94
	8 Weeks	0	45	79
Painted Wood	1 Day	28	100	100
	2 Weeks	15	10	23
	6 Weeks	0	3	0
	8 Weeks	0	0	3
Water-Sealed Wood	1 Day	2	98	100
	2 Weeks	0	100	100
	6 Weeks	0	100	100
	8 Weeks	18	86	94
	10 Weeks	4	56	84

Table 1. Mortality of *Aedes aegypti* mosquitoes following a 24 hour exposure to control or treated surface (1 gallon/1000 square feet). Shaded boxes in the table highlight when the efficacy resulting from the application of the pesticide met or exceeded the 90% population reduction threshold.



The residual efficacy of the product after 24 hours when applied to concrete was also tested against *Anopheles quadrimaculatus*. At both 0.03% and 0.06%, 100% mortality was noted at the 24 hour observation interval.

#### **Cockroaches [MRID 46371601]**

The registrant tested Talstar One at rates of (100, 200, 600, and 1000 ppm) or 0.0187% @ 1.2 gal/ 1000 sq ft (equivalent to 0.33 fl oz/ 1000 sq ft TalstarOne Multi-insecticide) and 0.05% @ 1.2 gal/ 1000 sq ft (equivalent to 1.0 fl oz/ 1000 sq ft TalstarOne Multi-insecticide) against German cockroaches, *Blatella germanica*, American cockroaches, *Periplaneta americana*, and the Oriental cockroach, *Blatta orientalis*. Insecticide was applied to ceramic tile, vinyl tile, and painted plywood and tested for residual activity for up to 3 months (See Table 2 for results).

#### **Ticks [46393501]**

The registrant tested Talstar 10 WP at a rate of 8 g/ 1000 sq ft (equivalent to 0.33 fl oz/ 1000 sq ft TalstarOne Multi-insecticide) and 24 g/ 1000 sq ft (equivalent to 1 fl oz/ 1000 sq ft TalstarOne Multi-insecticide) against the deer tick, *Ixodes dammini*, the Brown Dog Tick, *Rhipicephalus sanguineus*, the American Dog Tick, *Dermacentor variabilis*, and the Lone Star Tick, *Amblyomma americanum*. Laboratory assays examining the residual efficacy against *Ix. dammini* showed greater than 90% efficacy through 23 days. Small scale field studies evaluated the efficacy of Talstar 10 WP against *R. sanguineus*, *D. variabilis*, *A. americanum*. This study indicated that at both application rates (8 and 24g/1000 sq ft) the product was greater than 90% efficacious initially and for up to 2 weeks following application.

#### **Spiders [46393501]**

The registrant tested Biflex 100 EC at a rate of 12.5 mg a.i./ sq m (equivalent to 0.5 oz/ 1000 sq ft TalstarOne Multi-insecticide) and 25 mg a.i./ sq m (equivalent to 1.0 oz/ 1000 sq ft TalstarOne Multi-insecticide) against nuisance house spiders in a field study. The study showed greater than 90% population reduction of spiders for 6 months after treatment.

#### **House flies [46393501]**

The registrant tested Talstar 80 SC at rates of 12 mg a.i./ sq m (equivalent to 0.5 fl oz/ 1000 sq ft TalstarOne Multi-insecticide) and 24 mg a.i./ sq m (equivalent to 1.0 fl oz/ 1000 sq ft TalstarOne Multi-insecticide) and Biflex 100 EC at rates of 12.5 mg a.i./ sq m (equivalent to 0.5 fl oz/ 1000 sq ft TalstarOne Multi-insecticide) and 25 mg a.i./ sq m (equivalent to 1.0 fl oz/ 1000 sq ft TalstarOne Multi-insecticide) against house flies. Assays of treated unpainted pine and tile residual activity against the house fly measured at 2, 4, 8, 12, and 16 weeks post-treatment (Table 3).



Cockroach Species	Substrate	Application Rate (ppm)	% Knockdown		% Mortality (@ 24 hours)		
			(Day 0)		Day		
			1 hour	4 hours	0	30	90
German	Vinyl	100	21	79	71	100	68
		200	38	100	88	100	73
		600	47	100	89	100	95
		1000	69	100	97	100	100
	Ceramic	100	48	100	100	100	100
		200	56	100	100	100	100
		600	100	100	100	100	100
		1000	100	100	100	100	100
	Painted Wood	100	3	10	8	10	3
		200	15	18	20	10	3
		600	23	38	53	3	0
		1000	30	65	73	5	5
American	Vinyl	100	25	80	55	25	35
		200	10	75	70	45	25
		600	25	90	70	75	45
		1000	5	95	85	75	40
	Ceramic	100	40	85	95	95	65
		200	55	95	90	95	85
		600	25	100	95	100	70
		1000	15	100	100	100	65
	Painted Wood	100	0	0	0	0	0
		200	0	0	0	0	0
		600	0	45	40	0	0
		1000	15	85	55	0	0
Oriental	Vinyl	100	0	25	70	70	0
		200	0	80	60	85	45
		600	5	100	95	95	90
		1000	26	100	100	100	100
	Ceramic	100	5	10	10	30	10
		200	5	5	55	35	35
		600	20	75	80	95	80
		1000	20	100	100	100	100
	Painted Wood	100	0	0	0	0	0
		200	0	0	0	0	0
		600	15	15	15	5	0
		1000	15	15	15	0	0

**Table 2. Efficacy of Talstar One at various rates on various substrates against cockroaches.** Shaded boxes in the table highlight when the efficacy resulting from the application of the pesticide met or exceeded the 90% population reduction threshold.



	Exposure Time	Formulation	mg a.i./m <sup>2</sup>	% KD (15 minutes)	% Mortality				
					Weeks Post-Treatment				
					2	4	8	12	16
Tile	2 Hours	Talstar 80 SC	12.0	100	77	90	33	27	57
			24.0	100	80	93	73	57	67
		Biflex 100 EC	12.5	100	27	70	20	20	70
			25.0	100	77	87	40	50	83
	24 Hours	Talstar 80 SC	12.0	100	90	97	67	57	13
			24.0	100	90	100	73	93	17
		Biflex 100 EC	12.5	100	43	93	40	57	33
			25.0	100	80	97	67	83	47
Pine	2 Hours	Talstar 80 SC	12.0	100	70	100	37	43	63
			24.0	100	90	100	83	97	83
		Biflex 100 EC	12.5	100	53	57	20	0	37
			25.0	100	73	73	27	27	63
	24 Hours	Talstar 80 SC	12.0	100	90	100	8	97	50
			24.0	100	97	100	100	97	100
		Biflex 100 EC	12.5	100	93	77	63	67	60
			25.0	100	90	100	73	63	60

**Table 3. Percent knockdown and mortality for bifenthrin products at application rates equivalent to the subject registration against House flies.** Percentages in shaded boxes indicate that the mortality exceeds the required 90% threshold.

#### **Fleas [46393501]**

The registrant tested Talstar 80 SC at a rate of 12 mg a.i./ sq m (equivalent to 0.5 oz/1000 sq ft Talstar TC Flowable) and 24 mg a.i./ sq m (equivalent to 1.0 oz/1000 sq ft Talstar TC Flowable) and Biflex 100 EC at a rate of 12.5 mg a.i./ sq m (equivalent to 0.5 oz/1000 sq ft Talstar TC Flowable) and 25 mg a.i./ sq m (equivalent to 1.0 oz/1000 sq ft Talstar TC Flowable) against the cat flea, *Ctenocephalides felis*. For results see Table 4.



Surface	Exposure Time	Formulation	mg a.i./m <sup>2</sup>	KD (hours)		Weeks Post-Treatment				
				1	24	2	4	8	12	16
Tile	2 Hours	Talstar 80 SC	12.0	86	100	100	100	100	100	100
			24.0	88	99	100	100	100	100	100
		Biflex 100 EC	12.5	92	93	100	100	100	100	91
			25.0	94	94	100	100	100	100	100
	24 Hours	Talstar 80 SC	12.0	--	--	100	100	100	100	100
			24.0	--	--	100	100	100	100	94
		Biflex 100 EC	12.5	--	--	100	100	100	100	100
			25.0	--	--	100	100	100	100	100
Calico Fabric	2 Hours	Talstar 80 SC	12.0	--	--	96	80	75	70	12
			24.0	--	--	100	100	92	74	26
		Biflex 100 EC	12.5	--	--	89	58	70	52	6
			25.0	--	--	100	87	91	76	32
	24 Hours	Talstar 80 SC	12.0	--	--	100	97	93	97	61
			24.0	--	--	100	100	94	100	76
		Biflex 100 EC	12.5	--	--	96	70	80	72	28
			25.0	--	--	100	100	81	76	86

**Table 4.** Efficacy of bifenthrin products against the cat flea. Shaded table boxes indicate that the mortality exceeds the required 90% threshold.

#### ENTOMOLOGIST'S COMMENTS AND RECOMMENDATIONS:

1. **Mosquitoes**, up to 4 weeks residual control;

The registrant submitted data for both *Aedes aegypti* and *Anopheles quadrimaculatus*. The data submitted for *Ae. aegypti* generally support a 6 week claim (for treated materials stored indoors) at the 0.06% label rate, but only a 1 day residual claim at the 0.03% application rate. The study submitted for *An. quadrimaculatus* tested the efficacy of the product at only one day post-application; therefore, no support for residual claims is provided. Thus, the data are incomplete for evaluation of the desired claim. It is acceptable to this reviewer that if the label directions for use be modified to specify the 0.06% application rate for mosquito uses and residual kills (not controls) claim of 4 weeks – conditional upon the submission or citation of corroborative data. The corroborative data must be submitted by the registrant within one year. Furthermore, the materials treated should be left outside exposed to the elements between assays for residual activity. Residual data need to be provided for at least two species of mosquito.

The registrant must remove all claims against mosquitoes that may or can potentially transmit disease. The registrant has added claims within the directions for use against mosquitoes "that can potentially transmit arboviruses (West Nile fever, dengue fever,..."



Claims against vectors of the diseases listed are not supported by the data submitted. It is recommended that the registrant contact the efficacy reviewer to discuss protocols that will enable some of these claims to be supported. Some of the diseases (e.g., dengue fever) are not endemic to the U.S. and not appropriate for inclusion on the label.

2. **Cockroaches**, up to 7 months residual control;

The data submitted provide information for only 3 months against cockroaches. Seven month claims require the submission of data indicating 7 months of residual activity. The data submitted are inconclusive with respect to efficacy of the subject formulation against cockroaches. The registrant has provided sufficient data for the inclusion of conditional one month efficacy claims against cockroaches, but corroborative data using the Talstar TC formulation are required. Data must be submitted within one year that substantiate the one month claim against German, American, and Oriental roaches when the product is applied according to label directions to tile (ceramic and vinyl) and unfinished plywood sheeting. If the submitted data support the claim, a seven month claim may be amended to the label at that time.

Remove allergen/asthma claims. Medical claims are not permitted on pesticide labels; therefore, these claims must be removed.

3. **Ticks**, up to 4 weeks residual control;

The submitted data support a 2 week control claim, not a 4 week control claim as requested by the registrant. The submitted field data showed a marked decrease in efficacy after 2 weeks. Data may be submitted or cited to increase residual control claims to four weeks.

4. **Spiders**, up to 4 months residual control;

The registrant has requested a 4 month control claim against general house spiders. This claim is acceptable based upon the data submitted. The data support a 6 month claim, which may be accepted for this product at this time or as an amendment in the future. The claim does not apply to spiders of public health importance (i.e., black widow or brown recluse spiders). The label must include a disclaimer such as follows:

"This does not include Black Widow, Brown Recluse, or Hobo spiders."

Data may be submitted or cited for the inclusion of spiders of public health importance.

5. **House flies**, up to 3 months residual control;

The study submitted is not adequate for the inclusion of 3 month house fly control claims. Due to inconsistencies in the efficacy indicated for the products at greater than 4 weeks, a one month claim is warranted. The registrant may submit or cite data that substantiate a 3 month control claim.



6. **Fleas**, up to 3 months residual control;

The 24 hour mortality data submitted by the registrant are adequate for 3 month claim against fleas. However, the claim warranted is a 3 month kills claim, not a control claim. Controls claims require the submission of data obtained from trials approximating actual use conditions. The laboratory assay submitted does not provide sufficient information to determine if the product will provide control under field condition. Data may be submitted or cited to change the claim from kills to controls.

Enclosure  
000279-03206 S769919-ER